

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AIR QUALITY CONTROL GENERAL OPERATING PERMIT**

SOIL REMEDIATION UNIT GENERAL PERMIT

**GENERAL PERMIT 4
STATEMENT OF BASIS**

Qualifying Criteria

This permit is intended for soil remediation units (SRU) that are required to have a permit because they are 5 ton per hour industrial processes needing a control device to comply with state emission standards. (There are other reasons listed why an SRU might need a permit, but the 5 ton per hour criterion is the one that most typically causes the operation to need a permit.)

Since SRUs often include rock crushers to break down the oversize material to be fed into the process, the permit also allows the permit to be used for rock crushers. Rock crushers put into service after August 31, 1983 are subject to 40 C.F.R. 60, Subpart OOO. So the permit includes the requirements from Subpart OOO that apply to crushers known to operate in Alaska.

Crushers and associated equipment that capture emissions with mechanically induced draft, and emit them through a stack or vent are subject to additional requirements. But the department has not learned of any such units operating in Alaska. So we have not included the requirements in the permit. Operators of any crushers or associated equipment with mechanically induced draft subject to Subpart OOO would have to get a facility specific permit.

Excluded Facilities

The permit excludes a facility from using the permit if

- The facility has a facility specific limit,
- The facility is subject to certain EPA emission standards,
- The facility is subject to certain state emission standards, or
- Open burning will be done at the facility.

An operating permit, including a general permit, must contain permit conditions to assure compliance with all air quality control requirements [18 AAC 50.350(d) – (f)]. The general permit does not include conditions that would apply to the excluded facilities. However, the facility may operate under more than one general permit as long as all of the requirements that apply to the facility are adequately covered in at least one of the permits.

Standard Permit Conditions

Conditions 1 – 14 are listed in 18 AAC 50.345. That regulation requires the conditions to be in every operating permit, including general operating permits.

Rotary Kiln Thermal Desorber and Afterburner

Particulate Matter Emissions.

Condition 15

The particulate matter standard of 0.05 grains per dry standard cubic foot applies because the rotary kiln and afterburner (along with associated equipment) is an industrial process. It also fits the definition of fuel burning equipment. The emission limit applies to either an industrial process or fuel burning equipment. [18 AAC 50.055(b)(1)] However, if any SRU were constructed before July 1, 1972, and has not been changed in a way that increases the emission rate since, it would only have to comply with a 0.1 gr/dscf emission limit. [18 AAC 50.055(b)(3)]

18 AAC 50.350(d)(4) requires that the permit contain conditions necessary to ensure that the facility will comply with the emission standard in condition 15. Several conditions work together to ensure this.

Stack Testing

Condition 16.1 requires the operator to test stack emissions using the EPA reference test method and compare the results to the emission standard at least once every 5 years. If the results are close to the standard, the test must be repeated within a year. The tests should occur while processing soil that is representative.

Throughput Rates

Since the emission rate will depend on the amount of material processed in a given time period, once the emission rate has been measured, condition 16.2 only allows the equipment to be used at processing rates that do not exceed the rate that material was processed during source testing that showed compliance with the emission limit. This is to prevent operating at higher rates that may cause emissions which control equipment is not capable of handling as efficiently.

Soils with High Fines Content

The particulate matter emission rate is expected to depend on how much very fine particulate matter is in the soil being processed. Condition 16.3 says that if the soil contains over 30% fines, the operator must retest if no recent test was performed while processing material with a high fines content. Again, this is so that the testing done represents actual operation. Instead of conducting the extra source test, the facility can reduce the production rate based on the equation in condition 16.3. The equation assumes a linear relationship between the amount of material that can be processed while complying with the standard and the percentage of fine material in the soil processed.

The department will use a safety factor of 75% to be conservative and to account for non-linearity between production rate and % fines content of soil.

Permittees may submit to the department their own measurements and calculations showing the particulate matter standard is maintained. The department must approve this submittal before soil processing begins.

Facilities with Baghouses

Condition 17 gives minimum frequencies for baghouse inspections, and calls for monitoring pressure drop and outlet temperature, and maintaining these parameters within limits recommended by the manufacturer.

After a run is completed, the baghouse temperature will drop through the range where acid gasses will condense. Corrosion will be minimized if the temperature passes through this range as quickly as possible. Therefore this requirement is to maintain temperature until the baghouse has been purged. Reducing corrosion will lengthen the life of the baghouse and maintain the integrity of the fabric filter clamps and fasteners.

Monitoring the pressure drop across the baghouse enables the operators to determine how the baghouse is functioning. Baghouse differential pressure (dp) higher than the manufacturer's maximum recommended dp indicates too much buildup on the bags or a blocked hopper. Lower than manufacturer's recommended differential pressure may indicate that one or more bags have been damaged. Exit temperature monitoring and differential pressure is included to support this condition.

Equipment can remain idle for 6 months or more over the winter. Corrosion can occur during that time. The condition is intended to assure that control equipment will be effective when it is needed. These conditions are to be supported by maintenance logs.

Facilities with Wet Scrubbers

The permit also has a condition for periodic inspections of scrubbers, along with requirements that the pressure drop across the scrubber be within $\pm 30\%$ of that during a successful source test, and the water flow rate be at least 80% of the source test flow rate.

These conditions are intended to support compliance with opacity and particulate standards by encouraging proper scrubber maintenance.

Scrubber efficiency is related to the pressure drop. The range allowed is consistent with department experience, and with a similar provision in 40 C.F.R. 60, Subpart OOO.

Monitoring and recording of scrubber pressure drop once per day and daily records for maximum and minimum pressure differentials support this condition.

Scrubber efficiency is related to the water flow rate. The range allowed is consistent with a similar provision in 40 C.F.R. 60, Subpart UUU.

Continuous monitoring and recording of water flow rates, and daily records for minimum flow rate support this condition.

Operation and Maintenance Plan

The department has asked the facilities to submit an operations and maintenance plan that shows the frequency of inspections, cleanings and preventative maintenance repair or replacement. Proper operations and maintenance of both process or power generating equipment and pollution control equipment are important to preventing unnecessary emissions [Condition 30].

Visible Emissions Observations

The Beer-Lamber Law (or Bouguer's Law) provides the basis for the correlation between the plume opacity and particulate matter emissions. The relationship depends on the optical properties of the particulate matter emitted. The permit requires opacity observations to be taken during particulate matter sources tests. Visible emission observations provide ongoing information on particulate matter emissions.

Opacity

Conditions 19 and 20 reiterate the opacity limits that apply, and establish periodic monitoring using Method 9, EPA's reference test method for visible emissions. The condition requires that the readings be taken during operation that is typical of the maximum operation that will occur during the reporting period.

Sulfur Dioxide

Condition 21 presents the sulfur dioxide emission limit of 18 AAC 50.055(c). The most effective way to assure compliance with this limit is by tracking fuel sulfur content [condition 22]. This includes sulfur content of used oil that is used as fuel.

The department anticipates that the amounts of used oil generated on site are considerably less than what could be burned from off-site sources. If only small amounts are burned at any one time, testing each batch could be unreasonable. EPA guidance has recommended blending used oil 1 part to 3 parts fuel oil to reduce emissions. On-site used oil must be blended but need not be tested.

The limit on sulfur content for operation in a SO₂ special protection area is for protection of ambient air quality standards. The department performed ambient modeling and this is a conservative requirement. If facilities would like a less stringent fuel sulfur limit for operation in those areas, then the general permit can not be used and they must get a facility specific operating permit that include an ambient air modeling demonstration. 18

AAC 50.201 provides the authority for conditions in an operating permit to protect ambient air quality.

Stationary Diesel Engines

Emission Standards in 18 AAC 50.055 only apply to stationary diesel engines. An engine is classified as a nonroad engine [not stationary] if it does not remain in the same location for at least one year, or return seasonally for at least two consecutive annual operating seasons.

For diesel engines, Condition 23 includes the particulate matter, opacity, and SO₂ standards of 18 AAC 50.055(a)(1), (b)(1), and (c). The visible emission and particulate matter monitoring plan in Attachment 4 is patterned after the standard permit condition adopted by 18 AAC 50.346. The standard condition allows a permit to contain a different condition if it more adequately satisfies the requirements of 18 AAC 50.

The plan differs from the standard condition because sources operating under this permit tend to operate seasonally, rather than year round. So opacity monitoring schedules based on year round operation were changed.

The plan in this permit was also altered because it is highly unlikely that any diesel engine used under permit would have a stack with a diameter 18 inches or larger. So the conditions were simplified assuming all stacks would be smaller.

Crushers

Equipment which is subject to Subpart OOO is equipment at a fixed plant with a cumulative rating of all initial¹ crushers greater than 25 tons per hour; or equipment at a portable plant with greater than 150 tons per hour cumulative ratings. The pieces of equipment affected by the applicable conditions are rock crushers, grinding mills, screening operations, bucket elevators, belt conveyors, bagging operations, storage bins, enclosed truck or railcar loading stations. Only the pieces of equipment installed, reconstructed² or modified after August 31, 1983 are subject to Subpart OOO.

Condition 25 contains the applicable limits. It also says to label all NSPS equipment. Some equipment at a single plant typically is subject to the NSPS, while some is not. To assure compliance it is necessary that both operators and department staff be able to tell which is which.

Condition 26 contains the periodic monitoring. Method 9 observations must be done at least every 14 operating days.

¹ Initial crushers are defined as crushers that process some rock that has not been previously crushed.

² Reconstructed is defined in 40 CFR 60.673.

Replacement of pieces of equipment that are too old to be subject to Subpart OOO with newer equipment only makes the new equipment subject in certain cases –

- Replacing the entire line, or
- Increasing the capacity of the piece of equipment.

Condition 27 explains when the new equipment would become subject, and what must be done to notify EPA and the department.

Fuel Storage Tanks

Soil remediation units typically burn as fuel natural gas, propane, or a low volatility liquid fuel. If liquid fuel storage tanks are stationary, were installed after July 1984 and are larger than 10,567 gallons they are subject to an NSPS record keeping requirement. [40CFR60.116b(a) & (b), Subpart Kb] Condition 28 contains that requirement. It does not contain any of the emission control requirements of Subpart Kb because it is unlikely that an SRU would burn fuel volatile enough to trigger those requirements. Instead a facility that would burn the more volatile fuel is excluded from using this permit.

Facility Wide Requirements

Fugitive Dust

Soil remediation units have a considerable potential for generating fugitive dust. Soils treated may be of any type, and may contain any amount of fine particulate matter. It all depends on where contamination has occurred. Treated soils may be particularly difficult to handle without generating dust. They may have a very small moisture content after being heated to drive off volatile contaminants, and when still hot may not accept moisture that is applied.

18 AAC 50.045(d) requires an operator to take reasonable precautions to prevent fugitive dust when handling bulk materials. Condition 29 applies that regulation to soil remediation units. It lists examples of precautions which would be reasonable for this activity, to be used as necessary. To address site specific differences, the application had to have a dust control plan attached. The plan must be specific to any location named in the application. The condition also says that the applicant must revise the plan if requested by the department.

The applicant must comply with the plan. Therefore the plan must say what the operator will do and under what circumstances. Otherwise it would not be possible to tell whether the operator is following the plan or not.

Air Pollution Prohibited

Conditions 31 and 32 incorporate the regulation prohibiting air pollution of 18 AAC 50.110, and the corresponding standard condition for monitoring compliance that is adopted in 18 AAC 50.346.

Condition 34 lists several more conditions to prevent air pollution:

- Installing and using an afterburner to prevent release of toxic products of incomplete combustion. The temperature required to evaporate soil contaminants is much less than that necessary to completely burn them. An afterburner is important when treating soils which are naturally high in organic matter which can partially burn in the rotary kiln.
- A carbon monoxide emission limit and continuous emission monitoring system, and minimum afterburner temperature requirements. Because the soil remediation process is highly variable the department added these conditions to assure that there is adequate residence time and mixing at high temperatures to assure complete combustion before gasses are emitted to the ambient air.
- To assure that compounds emitted are not toxic, the permit restricts the contaminants that may be treated to only crude oil, and refined, non-chlorinated petroleum products. Hazardous materials that are regulated under the Resource Conservation and Recovery Act (RCRA) or the Toxic Substances Control Act (TSCA) are specifically excluded. However, some soils contain quantities of other contaminants that are small enough that they are not the reason for the cleanup. Some of these may be naturally occurring metals or chloride salts. The department considers this prohibition not to apply for the purposes of this permit if the other contaminants are below the listed cleanup levels in all samples of the material to be processed.
- Because volatile organic contaminants can escape during handling or treatment and cause adverse effects on nearby members of the public, the application requires a VOC control plan. Condition 34 requires compliance with the plan and allows the department to request revisions to the plan if we judge it is not adequate.

18 AAC 50.350(f)(3) says that the department will include conditions that are necessary to implement requirements of 18 AAC 50. This is the authority for putting each of the above in the permit to implement 18 AAC 50.110.

Location

Because of public complaints during the last 5 years, the department did additional modeling to predict the impacts of thermal soil remediation units on ambient air. Sources modeled were the stack emissions (as horizontal or vertical point sources), and handling and storage of treated soil (as a 1 cubic meter volume source). Handling and storage of treated soil, especially from the kiln outlet, is a typical source of public complaints about dust and odors.

The stack emissions were based on particulate matter source tests for Soil Processing, Inc., TPS, and Alaska Interstate Construction. Material handling emissions are based on

EPA's emission factors from AP-42, Section 13.2.4. The emission factors in that section (for drop operations) depend on wind speed and soil moisture. The wind speed was taken from the average wind speed for 5 years of data from the U.S. Coast Guard base in Kodiak. Since we do not have data on soil moisture content the modeling was done using several assumptions on moisture content. Each assumption was within the range of the data upon which the emission factor equation was derived.

Sources are patterned after the operation described in the operating permit application for SPI. Treated material leaves the kiln by conveyor or auger. It is taken from that pile to a stockpile area where it awaits test results, and from there to a third pile awaiting client pickup.

The model did not predict violations of ambient standards for any of the point sources by themselves. This is presumably because of the small size of the soil processing units, and because two of the three units modeled had very high stack temperatures, and therefore considerable plume buoyancy. Concentrations exceeding the increments for PM-10 and SO₂ were predicted out to some distance from the source.

The modeling results for fugitive emissions were highly dependent on soil moisture assumed for the treated soil. Under each assumption, modeling point and volume sources together did predict violations of ambient standard out to some distance from the facility. Assuming the highest soil moisture (4.8%) for all soil transfer points, predicted impacts would comply with the ambient PM-10 standard at a distance of about 70 meters from the operation. Assuming the minimum soil moisture (0.25%) for the first transfer point, the predicted distance to compliance would be 670 - 1000 meters (depending on the moisture content at the second transfer point).

Since the purpose of the operation is to evaporate volatile compounds, some of which have a higher boiling point than water, near zero moisture content may be a reasonable assumption. Water sprays at the outlet may or may not add appreciable moisture because the soil temperature at the outlet would be expected to be above 212 °F.

Because the results of this modeling depend on assumptions for which the department has only qualitative information, the modeling does not support denying this permit to operations already in place. Therefore, for existing sources, the permit will allow operation and rely on inspector observations and any public complaints where possible.

However, for sources operating at new locations, the modeling does not give a high level of assurance that the operation would comply with ambient standards. Therefore, the department proposes to allow use of this permit for thermal soil remediation operations at a new location only if the location is more than 700 yards from the nearest residence.

This location requirement is based on the best information available to the department. It does not guarantee that a soil remediation cannot violate ambient standards or cause violations the prohibition of air pollution if the equipment is properly run. Therefore, the

condition also advises the permittee that if the operation results in complaints, the complaints will be investigated, and lists some of the possible outcomes.

See Attachment 1 to this Statement of Basis for more information on the modeling performed.

Coastal Zone Management

Condition 35 adds specific fuel storage requirements of the coastal zone program. AS 46.14.120(d) requires permits to include comply with all state requirements.

Fees

Condition 36 and Attachment 2 implement the requirements to pay permit administration fees and emission fees. [18 AAC 50.400, 410.] The cost of issuing a general permit (permit administration fees) is a flat fee of \$300. But permit administration fees are also assessed for department staff time spent on the facility during the life of the permit. This typically includes such work as reviewing reports and inspections.

Annual emission fees are assessed at a rate set in 18 AAC 50.410. Fees are paid on any air contaminant emitted in amounts of at least 10 tons per year. The amount of emissions on which fees are paid is either the potential to emit, or is based on actual emissions. To pay on actual emissions, the permittee must send emission calculations to the department each year.

The condition in this permit is not the same as the standard condition adopted by reference in 18 AAC 50.346. Instead it directs the permittee to make emission calculations that are specific to this kind of equipment.

Monitoring, Record Keeping, and Reporting

Table 1 lists all of the monitoring, record keeping, and reporting requirements (MRR) that are included in the permit to satisfy 18 AAC 50.350(d)(4) and (f)(3), which say that the permit must include terms including monitoring, record keeping, and reporting necessary to ensure compliance with the requirements that apply to the facility.

Some of the MRR requirements listed include citations of other permit conditions where the requirements are more completely described. Others do not appear elsewhere and are established in Table 1.

Excess Emissions and Permit Deviations

The permit implements the standard conditions for excess emissions and permit deviation reporting, with the changes noted, as well as for air pollution prohibited. The adopted

standard condition says that the permit may use a different condition if there is a facility specific reason that the alternate condition will more adequately meet the requirements of 18 AAC 50. The standard language says that for permit deviations, the permittee must use the form provided in Attachment 3 of the permit. For excess emissions, the permittee also has the option of using the department's on-line form. The difference is because, at the time of adoption of the standard condition, there was no on line form for other permit deviations. Condition 37 allows the permittee the option of using an on-line form if the department develops one during the life of the permit. This more adequately satisfies 18 AAC 50 because the underlying statute directs the department to issue permits in a way that controls costs. The same information would be provided either way.

The general permit condition also directs the permittee to report within two days if there is a breakdown in an air pollution control device, and not to operate the plant after the breakdown until repairs are made. This source type has a great potential to cause violations of ambient standards and the prohibition of air pollution if operated without properly functioning air pollution control equipment.

Semiannual Facility Operating Report

The operating report (Condition 38) must include the following compliance information:

- Whether [and how] there were deviations from required plans – dust, VOC, O & M;
- Monitoring results;
- Summary of deviations;
- Summary of complaints and responses;
- Fuel information;
- Activity rates.

Each of these will help the department understand the compliance status of the facility. 18 AAC 50.350(i)(5) requires reports on required monitoring at least every six months, and also calls for reporting on deviations from permit conditions.